Case 3520

Boccardia proboscidea Hartman, 1940 (Annelida, SPIONIDAE): proposed conservation of the specific name

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Abstract. The purpose of this application, under Articles 23.9.3, 75.5 and 81.1 of the Code, is to conserve the much-used specific name *Boccardia proboscidea* Hartman, 1940 for a widely dispersed mudworm (family SPIONIDAE) from California. It is proposed that the name *Boccardia proboscidea* be given precedence over its rarely used senior subjective synonym *Polydora californica* Treadwell, 1914, and that previous type fixations for *Boccardia proboscidea* Hartman, 1940 be set aside and one specimen be designated as neotype for this species. It is also proposed that an untypified name *Spio californica* Fewkes, 1889 be suppressed to avoid unnecessary confusion.

Keywords. Nomenclature; taxonomy; Annelida; SPIONIDAE; *Boccardia proboscidea*; *Polydora californica*; *Spio californica*; mudworm; California.

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1. Fewkes (1889, p. 37) described a new polychaete species, *Spio californica*, based on material which he collected in Santa Barbara, California, in 1887. He did not illustrate the material but reported that 'In the fifth body segment there is a fan-shaped, deeply embedded bundle of large spines in addition to the dorsal and ventral clusters' (Fewkes, 1889, p. 38). Heavy spines in segment 5 is a characteristic feature of *Polydora* Bosc, 1802 and what we would now call in a general sense polydorins (a group of related genera sharing this apomorphy). Remarkably, although the name *Polydora* was in wide use at Fewkes's time, he did not refer his new species to this or any other polydorin genus.

2. There is no information concerning the whereabouts of type specimens of *Spio californica*. Crustaceans collected by Fewkes during his 1887 trip to California are deposited at the Museum of Comparative Zoology (MCZ), Harvard University, Cambridge, Massachusetts, where Fewkes worked as an assistant in charge of lower invertebrates under Alexander Agassiz from 1881 to 1889 (Swanton, 1931). Owing to Fewkes's association with this museum it is assumed that his other west coast specimens would have been deposited there as well. The only other museums that would be likely candidates to have received Fewkes's material are the Peabody

Museum of Natural History, Yale University, New Haven, and the American Museum of Natural History, New York. Requests for Fewkes's *S. californica* material were sent to these museums and each indicated *S. californica* was not deposited there.

3. Treadwell (1914, p. 203) described a new polychaete species, *Polydora californica*, based on material which he received for examination from the University of California, Berkeley. Treadwell (1914, p. 204) reported that a single incomplete specimen was 'taken from a tangled mass of tubes apparently constructed by the Polydora. No locality was recorded.' The belief that the animal was collected from California is based on the assumption that Treadwell would not have given it the epithet *californica* unless he had information to that effect. Treadwell did not make any reference to *Spio californica*, but was presumably aware of it as he listed Fewkes's paper in his bibliography and recorded another species, *Sabellaria californica*, described by Fewkes (1889) in the same paper (Treadwell, 1914, pp. 227, 228).

4. Along with the description of *Polydora californica*, Treadwell (1914, p. 204) noted that the 'Type [is] in the Museum of the University of California.' In the 1940s the UC polychaete collection was transferred to the Allan Hancock Foundation (AHF), University of Southern California, Los Angeles and later in 1988 to the Natural History Museum of Los Angeles County (LACM), Los Angeles. Two samples in the LACM-AHF polychaete collection are referable to Treadwell's species. One of them, LACM-AHF POLY 1555 has a small handwritten label '*Polydora californica* Treadwell. D5808' and another label that says 'Type'; both labels are in Hartman's handwriting. This sample was mentioned in Hartman's personal catalogue as: 'N 3255 *Polydora brachycephala* Hartman. San Francisco Bay, Calif. Albatross Sta D5808. (1). (labelled *P. californica* by Treadwell 1914).' This sample has been examined and found to consist of a single 38-chaetiger anterior fragment of a big worm in good condition. This specimen completely fits the diagnostic features of *Polydora brachycephala* Hartman and was one of the specimens she used to describe the species. As Hartman was aware that Treadwell had only a single specimen from an unknown locality (Hartman, 1940, p. 387) it has been assumed that the word 'Type' refers to *Polydora brachycephala*. This lot was cited in the original description of *P. brachycephala* although not specifically as a type. Another sample, LACM-AHF POLY 0638, has a small handwritten label (possibly in Treadwell's handwriting) '*Polydora californica* Treadwell. Type'. This sample was mentioned in Hartman's personal catalogue as: 'N 3254 Holotype *Polydora californica* Treadwell. No locality. Homonym. This is *Boccardia proboscidea* (1).' This sample has been examined and found to consist of a 57-chaetiger anterior fragment ca. 11 mm long and 0.9 mm wide, and 40-chaetiger posterior fragment ca. 5 mm long without pygidium, both in reasonably good condition. This specimen completely matches the description of *Polydora californica* and is considered herein as the only type (holotype) of Treadwell's species. Moreover, it does not fit a diagnosis of any other *Boccardia* species reported from California, but absolutely matches what Hartman (1940) described as *B. proboscidea*. It has the following characteristic features of *B. proboscidea*: (1) dark pigment line along each side of the prostomium, (2) prostomium anteriorly rounded, (3) caruncle extending to end of chaetiger 3, (4) chaetiger 1 with capillaries in both rami, (5) chaetiger 5 without dorsal superior

capillaries, (6) posterior notopodia with only capillaries, and (7) hooks in neuropodia accompanied by 1–2 inferior capillaries only in chaetigers 7–9.

5. Hartman (1940, p. 383) described a new polychaete species, *Boccardia proboscidea*, based on material which she collected in Caspar, California, in 1934. Along with the description of the new species Hartman (1940) provided a 'Systematic discussion' on the species of *Polydora* (sensu lato) from the west coast of the Americas. She noticed the presence of large spines on the fifth body segment in *Spio californica* Fewkes, 1889 but in the absence of type material confessed that 'It is difficult (perhaps impossible) to know what this is' (Hartman, 1940, p. 386). In print Hartman even doubted the inclusion of the species in the family SPIONIDAE because of the tube morphology reported by Fewkes, but finally concluded that 'I am unable to regard this as anything more than a *Polydora* in the broad sense' (Hartman, 1940, p. 387), i.e. as what we would now call a polydorin.

6. Hartman (1940, p. 387) noted that *Polydora californica* Treadwell 1914 'may be the same as the species herein described [*B. proboscidea*], but since the name turns out to be a questionable homonym, it should be replaced by another'. Nevertheless, nowhere in the text or in her later publications did she specifically state that *B. proboscidea* was the replacement name for *P. californica*. Moreover, Hartman later (1956, 1959) referred Treadwell's species to *Boccardia* sp.

7. Hartman sent some specimens of *B. proboscidea* to the United States National Museum of Natural History, Smithsonian Institution (USNM), Washington, D.C. and also deposited some at the Zoological Museum of the University of California (UC), Berkeley. In her paper, however, she only reported a holotype lot (USNM 20217) from Caspar, California (Hartman, 1940, p. 385), which in fact contains 12 specimens. It is impossible to tell from the description which specimen, if any, she intended to be the holotype. Along with the type of *P. californica* the UC lot of *B. proboscidea* was transferred in the 1940s to the Allan Hancock Foundation, University of Southern California, Los Angeles and later in 1988 to the Natural History Museum of Los Angeles County, Los Angeles. There is ample evidence in Hartman's personal papers & collection to show that this lot, LACM-AHF POLY 1226, was also considered by Hartman to be a type lot (LACM-AHF Polychaete Collection archives, unpublished). The specimens in both lots were collected by Hartman on 4 July 1934, from vertical burrows in intertidal sandstone at Caspar, Mendocino County, California. They have been examined and found to include specimens of the same species in good condition. Because it is not possible to identify the holotype in a so-called 'holotype lot', and the neotype designation is essential to maintain nomenclatural stability in this group, it is proposed that all previous type fixations for *Boccardia proboscidea* Hartman, 1940 be set aside and a neotype for this species be designated from USNM 20217 under Article 75.5 of the Code. One of us (V.I.R.) has examined twelve original specimens in USNM 20217 marked by Hartman (1940) as a 'holotype lot'. We suggest a neotype to be designated from this sample and the registration number USNM 20217 to be reserved for it. The neotype will be housed in the Smithsonian Institution in Washington, DC under USNM 20217, while the remaining specimens in Hartman's 'holotype lot' will be re-numbered.

8. Since Treadwell's (1914) description, *Polydora californica* has been mentioned by Hartman (1936, p. 32, incorrectly as a synonym of *Boccardia natrix* (Söderström,

1920); 1956, p. 257, and 1959, p. 383, both referred to *Boccardia* sp.), Uschakov (1950, 1953, 1955, 1959), and Kussakin (1975, p. 61, 1977, p. 253). Uschakov's material (cited by Kussakin, 1975, 1977) was examined and is being referred to a new *Boccardia* species (Radashevsky, in preparation). Thus, the species name has not been in wide use and, when used, was applied incorrectly.

9. *Boccardia* specimens matching Treadwell's (1914) and Hartman's (1940) descriptions are very common along the Pacific side of North America from British Columbia south to California, and also in Japan, Korea, China, Australia, Tasmania and New Zealand, and all were referred to as *B. proboscidea* (Hartman, 1941, 1954; Hartman & Reish, 1950; Berkeley & Berkeley, 1950, 1952; Woodwick, 1963, 1977; Imajima & Hartman, 1964; Paik, 1975; Blake & Kudenov, 1978, 1981; Light, 1978; Kudenov, 1979; Hobson & Banse, 1981; Dorsey, 1982; Hartmann-Schröder, 1982, 1989; Hutchings & Turvey, 1984; Yang & Sun, 1988; Sun, 1994; Petch, 1995; Sato-Okoshi & Okoshi, 1997; Sato-Okoshi, 2000; Lleonart, 2001; Gibson & Smith, 2004; Read, 2004; Sato-Okoshi et al., 2008). Numerous other literature sources such as environmental monitoring reports have also used this name. It is considered to be an introduced species in Australia (Pollard, 1990; Jones, 1991; Sliwa et al., 2009). During the last decade it was reported as an introduced species in Hawaii (Bailey-Brock, 2000), and South Africa (Simon & Booth, 2007; Simon et al., 2009, 2010), and also suggested to be invasive in the Bay of Biscay, northern Spain (Martínez et al., 2006), England and Argentina (Radashevsky, in preparation). *Boccardia proboscidea* was redescribed by Petch (1995) and Gibson et al. (1999). It has become the subject of numerous investigations due to its importance as an abundant intertidal inhabitant and also as a borer in shells of commercially important molluscs (Simon et al., 2009, 2010).

10. Hartman (1940) treated *Polydora californica* Treadwell, 1914 as a homonym of *Spio californica* Fewkes, 1889, which she believed was a polydorin species. On the other hand, Hartman (1940) repeatedly stated that Fewkes's species could not be placed into any genus and even doubted its family identity. Consequently, Hartman's (1940) homonymy statement about *Polydora californica* is uncertain and cannot be considered valid. Maintaining the name *Spio californica* would threaten stability and cause confusion because it is not unambiguously defined by the original description or any extant type material, has been applied incorrectly in the past and is still available with potential to confuse. It is proposed that this name be suppressed under Article 81.1 of the Code.

11. We have examined specimens on which Treadwell (1914) and Hartman (1940) based the description of *P. californica* and *B. proboscidea* respectively, and found them to be the same species, as did Petch (1995). Following the Principle of Priority the name *Boccardia proboscidea* Hartman, 1940 would have to be treated as a junior subjective synonym of *Polydora californica* Treadwell, 1914. This procedure would cause considerable confusion because the name *B. proboscidea* has been cited in numerous publications, and the name *Polydora californica*, while used several times, was applied incorrectly.

12. We urge that the specific name *Boccardia proboscidea* be conserved for one of Hartman's (1940) specimens under Article 23.9.3 of the Code, defined by the neotype as proposed in (7) above. Approval of this proposal will maintain the name in its accustomed usage.

13. The International Commission on Zoological Nomenclature is accordingly asked:

(1) to use its plenary power:
   (a) to rule that the name *proboscidea* Hartman, 1940, as published in the binomen *Boccardia proboscidea*, be given precedence over *californica* Treadwell, 1914, as published in the binomen *Polydora californica*, whenever the two are considered to be synonyms;
   (b) to set aside all previous type fixations for *proboscidea* Hartman, 1940, as published in the binomen *Boccardia proboscidea*, and designate as neotype one specimen from USNM 20217 under the same registration number;
   (c) to suppress the name *californica* Fewkes, 1889, as published in the binomen *Spio californica*, for the purposes of the Principle of Priority but not for those of the Principle of Homonymy;

(2) to place on the Official List of Specific Names in Zoology the following names:
   (a) *proboscidea* Hartman, 1940, as published in the binomen *Boccardia proboscidea* and as defined by neotype USNM 20217, with the endorsement that it is to be given precedence over *californica* Treadwell, 1914, as published in the binomen *Polydora californica*, whenever the two are considered to be synonyms;
   (b) *californica* Treadwell, 1914, as published in the binomen *Polydora californica*, with the endorsement that it is not to be given priority over *proboscidea* Hartman, 1940, as published in the binomen *Boccardia proboscidea* and as defined by neotype USNM 20217, whenever the two are considered to be synonyms;

(3) to place on the Official Index of Rejected and Invalid Specific Names in Zoology the name *californica* Fewkes, 1889, as published in the binomen *Spio californica* and as suppressed in (1c) above.

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